

CLAIMS

1. A process for preparing a fluorine-containing polymer, which is a batch copolymerization process conducted under conditions of reduced temperature of at least 0.95 and reduced pressure of at least 0.80 of the critical constant calculated from critical temperature, critical pressure and composition ratio of each monomer in the gaseous phase of the reaction vessel using the Peng-Robinson formula; wherein when the number of monomer components in the target polymer is represented as n (n is an integer of 2 or larger), the name of each monomer component is represented as $A_1, A_2, \dots A_n$, the weight percentage of each monomer component $A_1, A_2, \dots A_n$ of the target polymer composition is represented as $a_1, a_2, \dots a_n$ (%) (a satisfies $\sum_n a_n = 100$), the weight percentage of each monomer component of the initial monomer composition is represented as $a'_1, a'_2, \dots a'_n$ (%) (a' satisfies $\sum_n a'_n = 100$ and $a'_1, a'_2, \dots a'_n$ is determined in a constant manner depending on predetermined polymerization conditions) and specific gravity of the gaseous phase monomers when polymerizing/specific gravity of the target polymer is represented as B, the composition weight ratio of additional monomers is calculated for each monomer from the formula

$$(a_1 - a'_1 \times B) : (a_2 - a'_2 \times B) \dots (a_n - a'_n \times B)$$

in the order of components $A_1, A_2, \dots A_n$, and additional monomers containing additional monomers in the composition weight ratio of additional monomers are added.

2. The process for preparing a fluorine-containing polymer of Claim 1, wherein the polymerization pressure is at least 4 MPa.

3. The process for preparing a fluorine-containing polymer of Claim 1 or 2, wherein said fluorine-containing polymer is a copolymer comprising vinylidene fluoride and hexafluoropropylene; and the mol ratio of vinylidene fluoride:hexafluoropropylene is 9:1 to 5:5.

4. The process for preparing a fluorine-containing polymer of Claim 1, wherein the polymerization pressure is at least 3 MPa.

5. The process for preparing a fluorine-containing polymer of Claim 4, wherein said fluorine-containing polymer is a copolymer comprising vinylidene fluoride, hexafluoropropylene and tetrafluoroethylene; and the mol ratio of vinylidene fluoride:hexafluoropropylene is 9:1 to 5:5 and the content of tetrafluoroethylene is at most 40 % by mol.

6. A fluorine-containing polymer composition comprising the fluorine-containing polymer obtained by the process of Claim 1, a curing agent and a vulcanization accelerator.

7. The fluorine-containing polymer composition of Claim 6, wherein said fluorine-containing polymer has Mooney viscosity of at most 15 at 121°C and essentially does not contain iodine and said composition has compression set after vulcanization of at most 25 %.

8. The fluorine-containing polymer composition of Claim 6, wherein weight average molecular weight/number average molecular weight measured by GPC is at most 3.0.

5 9. A fluorine-containing polymer, which is a copolymer comprising vinylidene fluoride and hexafluoropropylene; wherein the mol ratio of vinylidene fluoride:hexafluoropropylene is 9:1 to 5:5, the content of tetrafluoroethylene is 0 to 40 % by mol, the weight average molecular weight is at most 140,000, weight average molecular weight/number average molecular weight is at most 3.0, iodine is
10 essentially not contained and the compression set after vulcanization is at most 30%.

 10. A fluorine-containing polymer composition comprising
15 the fluorine-containing polymer of Claim 9, a curing agent and a vulcanization accelerator.

 11. A processing aid comprising the fluorine-containing polymer obtained by the process of Claim 1, which has Mooney viscosity
20 of at most 15 at 121°C and essentially does not contain iodine.

 12. A processing aid comprising the fluorine-containing polymer of Claim 9.

25 13. A fluorine-containing polymer composition comprising the processing aid of Claim 11 and a fluorine-containing polymer having Mooney viscosity of at least 15 at 121°C.

14. A fluorine-containing polymer composition comprising the processing aid of Claim 12 and a fluorine-containing polymer having Mooney viscosity of at least 15 at 121°C.

- 5 15. A process for preparing vulcanized fluororubber, which comprises conducting primary vulcanization of the fluorine-containing polymer composition of Claim 10, while conducting defoaming treatment under reduced pressure.